

## *Stratiodrillus* (Annelida: Polychaeta: Histiobdellidae) associated with a freshwater decapod, with the description of a new species

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*Abstract*—A new species of Histiobdellidae (Annelida; Polychaeta) from Brazil, belonging to the genus *Stratiodrillus* (commensal polychaete) is described. *Stratiodrillus arreliai* is distinguished by the characteristics of the body appendages, and mandible apparatus as well as by its biogeographical distribution. A brief discussion is made on the association between the genus *Stratiodrillus* and the anomuran genus *Aegla*.

Freshwater decapod crustaceans are known to show a wide range of ectosymbiont invertebrates. These include protozoans, platyhelminths, nematodes, rotifers, annelids and small crustaceans. The occurrence and distribution of these associations as well as nutritional aspects of the physiology of some of these symbionts have been investigated (Cannon & Jennings 1987).

There are records of species of *Stratiodrillus* as symbionts of the following decapod genera: *Parastacus*, *Cherax*, *Trichodactylus*, *Astacoides* and, more frequently, *Astacopsis* and *Aegla* (Haswell 1900, Cordero 1927, Harrison 1928, Mouchet 1932, Vila & Bahamonde 1985, Nonato 1985, Cannon & Jennings 1987). In Brazil, the genus *Stratiodrillus* has been noted as commensal on the brachiuran *Trichodactylus petropolitanus* by Nonato (1985) and, in the present work, on the anomuran genus *Aegla*.

Among the several epibionts that are commonly associated with the Aegliidae, are the polychaetes that coexist with temnocephalid platyhelminths (Moyano et al. 1993). Several families of the Class Polychaeta have commensal species that live in the tubes or cavities of other polychaetes and crustaceans, in corals, and in echinoderms. Among these, the family Histiobdellidae includes some species with odd

characteristics in morphology and life history. These are divided in only two genera, *Histiobdella* and *Stratiodrillus*, epizootic polychaetes respectively of marine and freshwater invertebrates. The small polychaete *Stratiodrillus* occurs frequently among the branchial lamellae of crabs and feeds on the microflora that grows in the branchial cavity of the host (Cannon & Jennings 1987).

In this paper we record the association between *Aegla* and *Stratiodrillus* and describe the new species *S. arreliai* from Southeast Brazil. We also discuss briefly the main interspecific characters of the genus.

### The Genus *Stratiodrillus*

*Stratiodrillus* presents no distinction into prostomium and peristomium; head with seven appendages, five of these being tentacles (one medium and two lateral pairs). The second pair is bisegmented having sensorial (tactile) function (Haswell 1900). The other two appendages (anterior limbs) may aid in locomotion, according to Haswell (1900).

The mandible apparatus is black and extremely complex. It is composed of different pieces arranged in two sets: the upper and lower jaws. The upper jaws consist of

a median piece, "the fulcrum", and two sets of lateral pieces composing the rami. The lower jaws are paired throughout.

The body is constricted at regular intervals, and may be described as imperfectly divided into six segments (Haswell 1900). The first segment ("neck") is short and has no cirri. The second, third and fifth segments have each a mammiform elevation that bears the lateral cirri of the body (C1, C2, C3). The caudal region bears the posterior limbs which are not retractile and have one or two pairs of posterior cirri (C4, C5), which may be single or double. These characters are of great taxonomic significance to the species level. The tentacles and the cirri alike are tipped with fine sensory cilia.

The sexes are separate and dimorphic. The male has a pair of retractile ventral claspers in the fourth segment of the body very conspicuous, which are totally absent in the female. In the female the eggs are also easily distinguished as rounded volumes of different sizes.

*Stratiodrillus arreliai*, new species

Fig. 1

The record of individuals of *Stratiodrillus* completely confined to the branchial chambers of anomurans comes from specimens of *Aegla perobae* collected at Gruta da Peroba in the municipality of São Pedro, São Paulo state (22°55'S; 47°87'W). This anomuran species was described in 1977 and, to date, has not been recorded for other localities (Bond-Buckup & Buckup 1994).

The study of the above mentioned *Stratiodrillus* specimens led us to the conclusion that they belong to a new species, which we called *Stratiodrillus arreliai*. The new species show some similarities with the ones already described, but is distinguished mainly by the characteristics of the body appendages, the disposition of the mandible apparatus and by its geographical distribution.

*Material examined.*—A total of 18 spec-

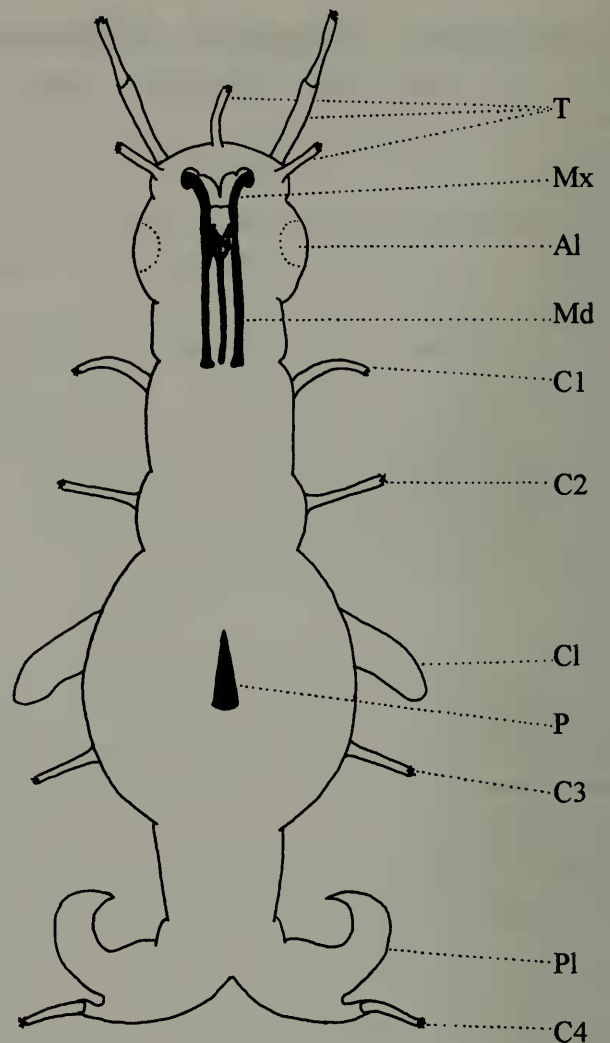


Fig. 1. *Stratiodrillus arreliai* new species (ventral view); anterior limbs (A1); 1st to 5th pair body cirri (C1–5); clasper (CL); mandible (Md); maxilla (Mx); penis (P); posterior limbs (P1); tentacles (T).

imens and 5 eggs of *Stratiodrillus* were found in only one individual of *Aegla perobae* (ten and eight individuals in either side of the branchial chamber). Five of these (three males and two females) were stained and slide mounted for microscopical study. The holotype is deposited in the "Museu de História Natural da Universidade Estadual de Campinas" (MHN-BPO-54).

Individuals of the new species are very small, like individuals of the other species of the genus. The total length of males and females, was in average 0.681 mm ( $n = 3$ ) and 0.745 mm ( $n = 2$ ), respectively. Measures for mandible apparatus averaged 0.145 ( $n = 3$ ) and 0.144 mm ( $n = 2$ ), respectively for males and females. One em-

Table 1.—Species of *Aegla* recorded in the state of São Paulo and their sites of occurrence.

Species	Site
<i>A. marginata</i> Bond-Buckup & Buckup 1994	Iporanga (cave)
<i>A. castro</i> Schmitt 1942	Itatinga and Ourinhos (river)
<i>A. franca</i> Schmitt 1942	Perus and Franca
<i>A. strinatii</i> Türkay 1972	Registro (river), Iporanga (cave) and Eldorado Paulista (river and cave)
<i>A. paulensis</i> (Schmitt 1942)	Perus and Paranapiacaba
<i>A. leptochela</i> Bond-Buckup & Buckup 1994	São Pedro (cave)
<i>A. perobae</i> Hebling & Rodrigues 1977	Iporanga (cave)
<i>A. cavernicola</i> Türkay 1972	Iporanga (cave)
<i>A. microphthalmalma</i> Bond-Buckup & Buckup 1994	Iporanga (cave)

bryo and one immature were also measured (total length 0.137 and 0.370 mm, and mandible apparatus 0.081 and 0.099 mm, respectively).

The tentacles of the head are elongated, those of the first anterior pair (T2) being as long as the median one. The second pair (T3) is three times as long as the first, with one distinct division (Fig. 1). The three pairs of lateral cirri (C1, C2, C3) are long and unsegmented. On the posterior border of each limb there is a long cylindrical tentacle (cirrus C4). The posterior cirri (C4) emerge from a support that is an extension of the body. The mandible apparatus is very long, reaching the first segment. In the embryo, the mandible apparatus is fully developed, being almost the size of the whole egg.

*Etymology*.—The name of the new species was given in honor of Arrelia (Waldemar Seyssel), a famous Brazilian clown. This is in accordance with the meaning of the family name Histriobdellidae, which stands for animal similar to a stage-player (clown-like, in a free translation).

#### The Host Anomuran *Aegla*

The genus *Aegla* has its distribution restricted to the temperate and subtropical regions of South America. It is characterized as being the only anomuran genus inhabiting exclusively freshwater. It occurs in lagoons, streams, swift flowing rivers and cave rivers (Bond-Buckup & Buckup

1994). In the neotropical region its limits of distribution are, to the North, the municipality of Franca (São Paulo state, Brazil), and, to the South, the province of Ultima Esperanza, in Chile.

Of the 34 species at present recorded from Brazilian freshwaters, 29 may be considered endemic. As noted by Bond-Buckup & Buckup (1994) this fact supports the hypothesis that most species of *Aegla* have small areas of occurrence. There are records of nine species for the state of São Paulo (Table 1).

Detailed information on the genus *Aegla* may be found in Bond-Buckup & Buckup (1994) which present a review of the family Aeglidae as well as the description of twenty new species.

#### Discussion

To this moment, seven species of *Stratiodrillus* have been described (including one described here), plus one in Chile that was mentioned by Moyano et al. (1993) as new, but remains undescribed (Table 2).

The main differences between these species, regarding the structure and number of the cirri (C1–C5) are presented in Fig. 2. *Stratiodrillus arreliai* seems to be most closely related to *S. aeglaphilus*, mainly for being a small sized species and for having long appendages. About the terminology used to characterize the cirri C4 and C5, the term “forked” does not seem adequate, since all the references about the described











Species	Lateral Cirri (C1, C2, C3)	Features of the Posterior Limbs Posterior Cirri (C4, C5)
<u>S. tasmanicus</u> Haswell	Bisegmented	C4 double non-segmented C5 absent 
<u>S. novaehollandiae</u> Haswell	Bisegmented	C4 single bisegmented C5 absent (dorsal lobe) 
<u>S. arreliai</u> n. sp.	Non-segmented	C4 single non-segmented basal support C5 absent 
<u>S. haswelli</u> Harrison	Non-segmented Distal, forked	C4 single bisegmented C5 absent small tubercle 
<u>S. Aeglaphilus</u> Vila & Bahamondi	Non-segmented	C4 single non-segmented C5 absent small tubercle 
<u>S. platensis</u> Cordeiro	Non-segmented	C4 double non-segmented C5 absent 
<u>S. pugnaxi</u> Vila & Bahamondi	Non-segmented	C4 double C5 double non-segmented 
<u>Stratiodrillus</u> sp. (in Moyano <i>et al.</i> 1993)	Non-segmented	C4 double C5 single non-segmented 

Fig. 2. Main differences among species, concerning the cirri (C1–C5).

species (including Moyano *et al.* 1993) indicate that they are double. Therefore, the term “forked” was replaced by “double” in this work, as it was mentioned in the discussion by Moyano *et al.* (1993). After consulting Haswell (1900) and Lang (1949), we concluded that the correct number of segments is six instead of five as mentioned by Vila & Bahamonde (1985).

Besides the structural differences as compared to fig. 3 of Moyano *et al.* (1993), these species may also be distinguished by their host species and geographical distribution. The genus *Stratiodrillus* (Haswell 1900) includes epizootic species exclusive to freshwater, with a high degree of specialization and peculiar geographical distributions. This supports the alleged geologi-

Table 2.—Species of *Stratiodrillus* and their hosts, with their geographical distribution.

Species	Host	Geographic distribution
<i>S. tasmanicus</i> Haswell 1900	<i>Astacopsis franklinii</i> (Gray)	Tasmania
<i>S. tasmanicus</i> Haswell 1900	<i>A. franklinii tasmanicus</i> Erickson	Tasmania
<i>S. novaehollandiae</i> Haswell 1913	<i>Astacopsis serratus</i> Shaw	Australia
<i>S. platensis</i> Cordero 1927	<i>Aegla laevis</i> (Latreille)	Uruguay, Argentina
<i>S. haswelli</i> Harrison 1928	<i>Astacoides madagascariensis</i> Milne Edwards	Madagascar
<i>S. aeglaphilus</i> Vila & Bahamonde 1985	<i>Aegla laevis</i> (Latreille)	Chile
<i>S. pugnaxi</i> Vila & Bahamonde 1985	<i>Parastacus pugnax</i> (Poepig)	Chile
<i>S. arreliai</i> new species	<i>Aegla perobae</i> Hebling & Rodrigues	Brazil

cal relationship between Australia, Madagascar and South America, as mentioned by Harrison (1928) and Vila & Bahamonde (1985).

The geographical distribution of *Stratiodrillus*, with such similar representatives in such distant continents and the coexistence on the same host with *Temnocephala* both in South America and in Australia, is no coincidence, as was mentioned by Cordero as early as 1927. The study of these distribution patterns may bring valuable insights to the comprehension of the vicariance model of biogeography of these groups, as well as to the understanding of the origin of the environments in which they are found.

#### Acknowledgments

We are deeply grateful to Dr. E. F. Nonato and Jorge Rodolfo Lima for their incentive, valuable suggestions and for providing relevant literature.

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